

POWERLESS AGAINST CLIMATE CHANGE: THE CONSEQUENCES OF GOVERNMENT
INTERVENTION IN INVESTOR-OWNED UTILITY BANKRUPTCIES ON CREDITOR
RECOVERIES AND INCENTIVE ALIGNMENT

By

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ABSTRACT

PG&E is widely regarded as the first climate-change caused Chapter 11 bankruptcy. Since then, numerous other investor-owned utility companies have declared bankruptcy due to climate disasters. Historically, due to the wide-reaching consequences of utility service disruptions to broader economic activity, state and local government officials have involved themselves in utility bankruptcies to ensure services continue and ratepayers are protected from drastic rate spikes.

This paper will explore what effect, if any, government involvement in utility Chapter 11s has on creditor recoveries, moral hazard, and incentive alignment. An event study of bond trading prices around the time of PG&E's bankruptcy elucidates investor sentiment regarding climate and political economy risk present in the region. The study suggests that government intervention in PG&E caused investors of peer companies to view their investments as less risky. Finally, this paper explores potential solutions to manage climate damages in a way that decreases moral hazard.

Keywords: Chapter 11 bankruptcy, Investor-owned utility, Climate change, Moral hazard, Climate risk, Bailout, Bond event study

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Introduction

Climate risk poses a widespread threat to management, investors, and consumers. In fiscal year 2021, over 90% of S&P 500 Companies listed climate risk as a threat to their operations in their 10-K¹. Moody's quantifies that \$8.7 trillion dollars of their globally rated debt is exposed to heightened climate risk. This number has increased 49 percent since 2018². There are few industries where this risk is more pronounced than in investor-owned utilities. Investor-owned utility companies have the unique burden to provide their consumers with reliable services at regulated rates while creating value for their shareholders³. Climate disasters have the propensity to disrupt utility services by destroying their production and distribution equipment. The increased frequency and heightened magnitude of destruction caused by weather-related disasters has posed significant stress to investor-owned utility companies. Investor-owned utilities must be able to invest in adequate asset resiliency measures to prevent service disruptions and maintain the capital needed to repair damaged property while avoiding significant increases in costs to ratepayers. Failure to provide utility services can be costly, in terms of lives lost, regulatory fines, and lost profits.

The magnitude of damages from the increasing frequency of climate disasters is considerable over a long horizon. Brookings projects that “the rise of more frequent and

¹ Saunders, Elizabeth. “Leading Companies aren’t waiting to disclose their climate actions in the proxy and 10-K. Neither should you.” Clermont Partners. January 4, 2023.

<https://www.clermontpartners.com/blog/leading-companies-arent-waiting-to-disclose-their-climate-actions-in-the-proxy-10-k-neither-should-you/>

² “Research Announcement: Moody's - Thirteen sectors with \$3.4 trillion of debt face heightened environmental credit risk.” Moody's Investors Service. December 14, 2020.

https://www.moody's.com/research/Moodys-Thirteen-sectors-with-34-trillion-of-debt-face-heightened--PBC_1256574?showPdf=true

³ For the purposes of this paper, investor-owned utilities are any utility company that has public shareholders and is regulated by the government

destructive storms, droughts, wildfires, and other acute shocks has amounted to over \$1.8 trillion in economic costs since 1980⁴.” Risk is heterogeneous based on geographical factors; damages tend to be concentrated in coastal regions which are at higher risk for hurricanes, flooding, and wildfires. Accordingly, concentrated climate risk increases costs to investor-owned utility companies incongruously. Based on current projections of sea level rise and hurricane activity, storms across the East Coast and Gulf of Mexico will increase from 11 to 27 percent in the next 15 years, which will cause an additional \$3-7 billion in annual property damages to utility companies in the region⁵. Damages from these storms are catastrophic; currently, a typical utility company located in an affected coastal region saw over \$1.4 billion in storm damage and lost revenue over a 20-year period. Across the country, infrastructure costs for electrical transmission and distribution are expected to increase 25% by 2090 due to climate change⁶.

In addition to damages sustained by climate events, investor-owned utility companies often directly contribute to the damages they sustain. In the past four years, equipment owned by California’s three largest investor-owned utilities has been found responsible for over 2,000 fires⁷. Many of these fires could have been avoided with simple vegetation management

⁴ Tomer, Adie et al. “Rebuild with Purpose: An Affirmative Vision for 21st Century American Infrastructure.” Brookings. April 2021. https://www.brookings.edu/wp-content/uploads/2021/04/20210413_brookingsmetro_american-infrastructure-vision_report.pdf

⁵ Paulson Jr, Henry. “Short-Termism and the Threat from Climate Change | McKinsey.” April 1, 2015. <https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/short-termism-and-the-threat-from-climate-change>.

⁶ Fant, Charles et al. “Climate Change Impacts and Costs to U.S. Electricity Transmission and Distribution Infrastructure.” Energy. January 3, 2020. <https://reader.elsevier.com/reader/sd/pii/S0360544220300062?token=9443DF1D6193DFB91819041757DA0F4090B49C79B52C3C57F352D0D33611C5E64F8C49005BBE6093DA7A7827600F8A59&originRegion=us-east-1&originCreation=20230225024234>

⁷ Carolyn Kousky, et. al. “Wildfire Costs In California: The Role of Electric Utilities.” Wharton Risk Management and Decision Processes Center. September 2018. <https://riskcenter.wharton.upenn.edu/wp-content/uploads/2018/08/Wildfire-Cost-in-CA-Role-of-Utilities-1.pdf>

techniques⁸. Similarly, in Texas, three energy companies declared bankruptcy in 2021 after winter storm Uri froze their generation and transmission equipment⁹. The state-wide electricity crisis could have been avoided if utility companies underwent the recommended winterization steps to prevent generation and distribution equipment from freezing. While the upfront costs of state-wide winterization could cost up to \$95 million dollars, the direct and indirect costs of the 2021 storm alone are estimated to be between \$80-130 billion dollars, making the preventative winterization extremely cost effective¹⁰.

In extreme case, climate-related damages are significant enough to push an investor-owned utility company into bankruptcy. In the United States, there have been numerous investor-owned utility Chapter 11 bankruptcies. The most significant Chapter 11 bankruptcies in the 21st century, in terms of debtor size, are PG&E (2001, 2019), Calpine Corporation (2005), Entergy New Orleans (2005), Dynegy Holdings, LLC (2011), Energy Future Holdings (2014), FirstEnergy Solutions (2018), and Brazos Electric Power Corporative (2021).

While utility companies have faced damages from climate events for centuries, the number of utility bankruptcies in the last two decades has sky rocketed as climate disasters intensify in frequency and magnitude. Bankruptcy courts and governments have struggled to determine the best path forward in numerous of these cases as utility bankruptcies are notably

⁸ McFall-Johnsen, Morgan. “Over 1,500 California fires in the past 6 years – including the deadliest ever – were caused by one company: PG&E. Here’s what it could have done but didn’t.” Business Insider. November 3, 2019. <https://www.businessinsider.com/pge-caused-california-wildfires-safety-measures-2019-10>

⁹ Farmer, Matt. “Third Energy Firm Declares Bankruptcy in Texas Snow Storm Fallout.” Power Technology. March 16, 2021. <https://www.power-technology.com/news/industry-news/texas-snow-storm-bankrupt-fallout-energy-prices-ercot/>

¹⁰ Golding, Garrett, et al. “Cost of Texas’ 2021 Deep Freeze Justifies Weatherization.” Federal Reserve Bank of Dallas. April 15, 2021. <https://www.dallasfed.org/research/economics/2021/0415>

different than bankruptcies in other sectors. Because utilities provide an essential public service, liquidation is not a feasible option. Additionally, numerous stakeholders beyond the creditors have a vested interest in the outcome of the case. For this reason, local and state governments have attempted to legislate a solution or involve themselves in the bankruptcy process to ensure that broader societal goals are met through the plan of reorganization.

In this paper, I aim to analyze the consequences of government involvement in these bankruptcies: the incentive structure it creates for management, its effect on moral hazard, investor reactions, and effect on ratepayers. Understanding the potential consequences of government involvement can help governments, regulators, and courts pursue strategies that can affectively mitigate climate risk in the utility sector without directly burdening taxpayers. These considerations will help policy makers incentive management to act in a way that increases the resiliency of utility services and mitigates damages in the long-term.

Thus far, each utility bankruptcy has been handled different based unique company-specific considerations, the bankruptcy code, and state regulatory considerations. However, I believe broad themes are present throughout all of them that can be generalized into actionable considerations for future cases. In this paper, I will do an event study of the most recent bankruptcies, PG&E, to highlight consequences I believe are relevant and applicable to future bankruptcies.

Background on Bankruptcy¹¹

The US bankruptcy system allows companies, known as debtors, to file for either Chapter 7 or Chapter 11 bankruptcy. If a debtor can prove that the going-concern value of a company is higher than its liquidation value, it can file for Chapter 11. Chapter 11 allows a debtor to restructure by negotiating with creditors to decrease their obligations, usually debt and leases. In a situation where the creditors see value in the debtor's future operations, they are usually willing to renegotiate the terms of their repayment to be more favorable towards the debtor. This benefits the creditor as in a Chapter 7 liquidation they are very unlikely to receive a favorable recovery since assets are often sold for less than they are worth in a fire sale. In the context of utility bankruptcies, Chapter 7 bankruptcies are extremely rare. Because utility companies provide an essential service, and often have a natural monopoly in a region due to high fixed costs and regulatory processes, there is a governmental interest in ensuring they emerge from the bankruptcy process as a functioning entity.

In a Chapter 11 proceeding, creditors are split into classes based on their relative seniority and the collateral (if any) backing their claims. Any class of creditors who receives less of a recovery due to the bankruptcy than they would have absent bankruptcy is considered impaired. A plan of reorganization, which details how a company's debt obligations will be restructured for them to exit bankruptcy, must be approved by each impaired class¹². In most cases, the bankruptcy judge will approve a plan of reorganization if it is deemed to be feasible to implement, if recoveries are fair and equitable to each class based on seniority, and all impaired

¹¹ This summary of the bankruptcy process is a short primer that draws on principles listed in the US Bankruptcy Code that are most relevant to this paper. It is in no way a complete or exhaustive summary of the US Bankruptcy process.

¹² At least 2/3 in dollar amount and 1/2 in number of creditors in a class must vote in favor of the plan for the class to be considered in favor of the plan.

classes of creditors vote in favor of the plan. Once a plan is approved, the company can emerge from the bankruptcy process. A key provision of the Chapter 11 process is that the debtor can continue to operate, and, absent substantiated fraud allegations, management remains in charge of the estate. To prevent a run-on assets, which could lead to unequal returns within a class, an automatic stay is granted which halts all payments to creditors during the Chapter 11 process unless approved by a judge.

Precedence of Government Involvement

Utility companies' role as an essential service provider make their bankruptcies of high public interest. Investor-owned utilities occupy a unique position between a private company and a public utility. While investor-owned utilities must gain regulatory approval for their rates, as long as they provide services according to regulatory guidance, shareholders ultimately have substantial discretion to pursue their goal of maximizing the firm's operating profits. For this reason, local and state politicians often feel compelled to directly involve themselves in the bankruptcy process as an advocate for their constituents, to ensure that essential services continue, ratepayers are protected, regulations are followed, and that the plan of reorganization is feasible and sustainable.

The involvement of state governments in a utility bankruptcy has legal precedence. In Public Service Co of New Hampshire's 1989 bankruptcy, "the bankruptcy court expressly held that the State of New Hampshire "will be granted full party interest status under §1109(b) of the Bankruptcy Code and will be granted general intervenor rights under Rule 2018(a) of the Bankruptcy rules.'" The Court believed that government involvement would expedite the emergence process by allowing the reorganized entity to gain regulatory approval concurrent with court approval to reorganize¹³. In some cases, government involvement is limited to press releases supporting or condemning certain aspects of the plan. Other times, local and state officials present a legislative solution, such as a bailout or a reformed regulatory scheme, or

¹³ Mabey, Ralph R., and Malone, Patrick S. "Chapter 11 Reorganization of Utility Companies." Energy Law Journal. <https://heinonline.org.proxy.library.upenn.edu/HOL/P?h=hein.journals/energy22&i=301>.

mandate stipulations that must be met in the plan of reorganization for the utility to gain regulatory approval.

Historically, due to government interest in utilities continuing to provide essential service, investors have not borne the brunt of the costs associated with the failure of a utility company. In PG&E's 2001 bankruptcy, despite evidence of risky business strategy, excessive dividends, and substantial leverage, the judge approved a plan backed by regulators that created a \$2.2 billion dollar regulatory asset that would allow PG&E to boost their equity to keep investment grade credit status¹⁴. However, ratepayers directly bore the cost of this asset as it was amortized into retail electric rates for the next nine years. In PG&E's 2019 bankruptcy, all existing secured and unsecured bondholders were given new secured bonds in the reorganized entity, shielding them from major losses¹⁵. Additionally, in response to the magnitude of damages, the California state government created a new \$21 billion dollar Wildfire Relief Fund (Bill 1054) to backstop investor-owned utilities and pay damages on their behalf in future wildfires that cause the company to sustain damages exceeding one billion dollars. \$10.5 billion dollars of the recovery fund came from contributions from the three largest investor-owned utilities in the state, while the other half came directly from ratepayers in the form of rate increases¹⁶. Critics of the fund have argued that it is taxpayer funded insurance for investor-owned utilities.

¹⁴ PG&E 2001 Settlement Agreement. https://www.pgecorp.com/news/pdf/settle_01.pdf

¹⁵ Scaggs, Alexandra. "PG&E Made a Deal with Bondholders: The Details, and Why California's Governor Wants Changes." Nasdaq. January 23, 2020. <https://www.nasdaq.com/articles/pge-made-a-deal-with-bondholders:-the-details-and-why-californias-governor-wants-changes>

¹⁶ AB-1054 Public utilities: wildfires and employee protection. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB1054

Government assistance in the Chapter 11 process is similarly the norm outside of California. In Entergy’s 2005 bankruptcy, the Louisiana State government and the Federal government provided funds to help the company emerge¹⁷. Similarly, in Energy Future Holdings Corp’s in 2014, the company filed for bankruptcy after one of the largest LBOs in history, costing over \$40 billion in funds, 96% of which was borrowed. However, Texas’ state regulators decided that the most effective way to maintain energy reliability in the state of Texas was for ratepayers to absorb higher rates to cover the company’s liabilities, which many critics have argued is a disguised bailout¹⁸. Similarly, in 2019 Ohio ratepayers paid over one billion dollars to bailout FirstEnergy Solutions despite evidence of fraud¹⁹.

The precedence of government involvement in past utility Chapter 11s has led to investors of investment-grade utility companies to feel reasonably certain that they will not be expected to directly bear the cost of climate-related damages. To determine if bondholders of these companies view their investments as exposed to the risk of climate damages, Columbia University’s SIPA Center on Global Energy Policy investigated the impact of PG&E’s 2019 bankruptcy on the cost of debt of California-based peer companies. Despite PG&E widely being referred to as the first climate change bankruptcy, spreads of peer company bonds saw a modest uptick right after the PG&E bankruptcy, but spreads have subsequently remained below its historical five-year average (approximately 1.8%). The same trend holds for other utility

¹⁷ Daly, Erin Marie. “Entergy Wins \$200M in Federal Bailout.” Law 360. October 13, 2006. <https://www.law360.com/articles/11799/entergy-wins-200m-in-federal-bailout>

¹⁸ Azgad-Tromer, Shlomit. “Too Important to Fail: Bankruptcy Versus Bailout of Socially Important Non-Financially Institutions.” Harvard Business Law Review. 2017. <https://www.hblr.org/wp-content/uploads/sites/18/2017/06/Too-Important-to-Fail-Bankruptcy-Versus-Bailout-of-Socially-Important-Non-Financial-Institutions.pdf>

¹⁹ Diaz, Jaclyn. “An Energy Company Behind A Major Bribery Scandal In Ohio Will Pay a \$230 Million Fine.” NPR. July 23, 2021. <https://www.npr.org/2021/07/23/1019567905/an-energy-company-behind-a-major-bribery-scandal-in-ohio-will-pay-a-230-million->

companies in climate-event heavy regions. This finding suggests that investors don't view climate damages as a systemic risk or a threat to their returns due to the belief that, absent negligent behavior from the company, costs will predominantly fall on other stakeholders: ratepayers, insurance companies, and taxpayers²⁰.

To mitigate moral hazard, state and local governments have attempted to place limitations on investor-owned utilities who receive government support. However, these measures have not been stringent enough for investors to realize climate risk to the point of incentive alignment. Regulators often mandate the suspension of dividend distributions to pass costs on to shareholders, as was the case in PG&E. Requirements to remove board members or officers is also common and was a requirement in FirstEnergy Solutions and PG&E. Fines and payments to disaster victims have also been utilized to shift the burden to investors. However, these actions are largely symbolic and do not meaningfully impact shareholders enough to change their incentive structure. The limited magnitude of these actions is seen as a cost of doing business in a regulated industry. Government bailout funds only further reinforce the idea that climate risk is not a risk to investors by socializing the costs of climate risk through taxpayer-funded bailouts while allowing the profits of the business to remain private. This risk-reward asymmetry is driving the short-termist behavior that has exacerbated the impact of these potentially mitigated climate-event related damages²¹.

²⁰ MacWillimans, John et al. "PG&E: Market and Policy Perspectives on the First Climate Change Bankruptcy." Columbia Center on Global Energy Policy. August 2019. https://www.energypolicy.columbia.edu/wp-content/uploads/2019/08/PGE-CGEP_Report_111722.pdf

²¹ Lynch, Loretta. "How Climate Broke California's Biggest Utility." Climate One. April 18, 2019. <https://www.climateone.org/audio/how-climate-broke-california%E2%80%99s-biggest-utility>

Moral Hazard and Incentive Alignment

Government involvement in investor-owned utility bankruptcies have allowed companies to benefit from a free insurance policy: taxpayer bailouts. The willingness of governments to step in when investor-owned utility companies fail to provide essential services make their shareholders and managers particularly susceptible to moral hazard²². The bankruptcy court system and government officials play an important part in setting precedence that can align interests between shareholders and ratepayers. Unlike other companies where judges and politicians don't have a strong vested interest in preserving the company as a going-concern, utility companies tend to have natural monopolies and provide services that cannot be halted. Similar to large banks, who were deemed by regulators as "Too Big to Fail" during the 2008 financial crisis, utility companies have been identified as socially important non-financial institutions whose failure would be too catastrophic for taxpayers to allow. Unfortunately, this mentality has created moral hazard as shareholders view taxpayers as a free insurance fund in the event of failure. These quasi-bailouts have been criticized by many scholars as they often lead to investors receiving full recoveries while taxpayers are forced to foot the burden. When investors are not expected to take a haircut in the event of failure, there is no pressure on management to invest in a sustainable or risk-conscious manner which further exacerbates the magnitude of future damages²³.

²² Moral hazard is when there is a lack of incentive for a party to hedge against risk because they believe they will not have to bear the entirety of the consequences themselves.

²³ Azgad-Tromer, Shlomit. "Too Important to Fail: Bankruptcy Versus Bailout of Socially Important Non-Financially Institutions." Harvard Business Law Review. 2017. <https://www.hblr.org/wp-content/uploads/sites/18/2017/06/Too-Important-to-Fail-Bankruptcy-Versus-Bailout-of-Socially-Important-Non-Financial-Institutions.pdf>

Governmental intervention to alleviate the burden on investor-owned utilities from climate damages has created a perverse incentive for utility companies to delay investment in asset resiliency, which could prevent or limit future damages²⁴. Without regulatory guidance or profit incentive, shareholders usually do not prefer to invest in preventative measures to increase asset resiliency. These investments have high upfront costs, and the benefits are realized over a significantly longer timeframe leading shareholders to steeply discount their benefits²⁵. Shareholders of large investor-owned utility companies are often not residents of the region served by the company and are unlikely to be personally affected by service disruptions. Shareholders are only likely to be incentivized to support investment in cost-effective mitigation measures if they are forced to bear the costs of damages in the short-term. If ratepayers' foot the damages through rate increases or if governments step in to cover damages, this could further undermine incentive alignment between shareholders and ratepayers leading to worse damages in the long run.

The absence of national regulatory guidance for climate risk prevention coupled with the frequency of government bailouts has led investor-owned utilities to underinvest in cost-effective risk mitigation. The lack of incentive to invest in preventative measures is costly for companies and ratepayers. The average Southeastern utility company would need to invest between \$700 million and \$1 billion dollars to increase their asset resiliency. That is significantly less than the

²⁴In this paper, the asset resiliency measures discussed are investments to protect electricity production and distribution equipment from climate damages.

²⁵ Kihm, Steve et al. "Regulatory Incentives and Disincentives for Utility Investments in Grid Modernization." Future Electric Utility Regulation Advisory Group. May 2017. <https://ipu.msu.edu/wp-content/uploads/2017/09/LBL-FEUR-Regulation-and-Incentives-2017.pdf>

expected \$1.7 billion in damages they are expected to endure if they do not invest at all²⁶. The cost of underinvestment is high as it can strain utility companies' credit quality increasing their borrowing costs, increase costs to consumers, and lead to electricity disruptions limiting broader economic activity²⁷. Underinvestment is also further worsening the damages caused by extreme weather events. Kolhatkar finds PG&E's damages from the Butte fire were worsened by the fact that the company did not invest in simple measures like trimming trees around electrical equipment, which caused the fire to burn longer than it otherwise would have²⁸. Given the high costs of underinvestment in preventative measures, it is important to understand how regulators can make these investments appear to be more attractive to shareholders.

The chronic underinvestment in risk-mitigation infrastructure increases the burden on ratepayers and governments in regions where climate risk is highly saturated. Municipalities that are prone to climate disaster see higher borrowing costs and a higher risk of municipal bankruptcy making it harder for them to recuperate the costs and provide necessary public services²⁹. Residents of these regions are also more likely to suffer repeated physical, financial,

²⁶ Brody, Sarah et al. "Why, and how, utilities should start to manage climate-change risk." McKinsey. April 24, 2019. <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/why-and-how-utilities-should-start-to-manage-climate-change-risk>

²⁷ Behnam, Rostin and Litterman, Bob. "Managing Climate Risk in the U.S. Financial System." 2020. Market Risk Advisory Committee of the FTC. <https://www.cftc.gov/sites/default/files/2020-09/9-9-20%20Report%20of%20the%20Subcommittee%20on%20Climate-Related%20Market%20Risk%20-%20Managing%20Climate%20Risk%20in%20the%20U.S.%20Financial%20System%20for%20posting.pdf>

²⁸ Kolhatkar, Sheelah. "The P.G. & E. Bankruptcy and the Coming Climate-Related Business Failures." *The New Yorker*. February 26, 2019. <https://www.newyorker.com/business/currency/the-pg-and-e-bankruptcy-and-the-coming-climate-related-business-failures>.

²⁹ Archarya, Viral v. et al. "Is Physical Climate Risk Priced? Evidence from Regional Variation in Exposure to Heat Stress." National Bureau of Economic Research. September 2022. https://www.nber.org/system/files/working_papers/w30445/w30445.pdf

and emotional damages from the increased frequency of these events. These residents are disproportionately low-income, people of color with limited access to the capital needed to pay for the damages or relocate to other regions³⁰. Ratepayers bearing the costs of these damages is often a crippling financial burden on them and does not incentivize utility companies to invest in preventive investments as low-income ratepayers have extremely limited influence on management decisions.

Shifting the burden from ratepayers to investors is a potential way to decrease the geographical concentration of climate risk. Unlike ratepayers who are not able to readily decrease their exposure to geographical climate risk, shareholders have access to international financial markets that allow them to diversify their portfolio³¹. Additionally, they have a more formalized mechanism to directly influence the actions of management through shareholder votes and the considerable overlap between shareholders and management. Shareholders bearing some amount of climate risk will help diminish moral hazard by increasing incentive alignment between management and ratepayers.

³⁰ Baker, Judy L. "Climate Change, Disaster Risk and the Urban Poor." 2012. <https://books.google.com/books?hl=en&lr=&id=gYxxtf4BvNgC&oi=fnd&pg=PR5&dq=climate+risk+concentrated+on+the+poorest&ots=mlNrF2hJut&sig=w3xmQLcXGBZHjtdLUW14T75euEE#v=onepage&q=climate%20risk%20concentrated%20on%20the%20poorest&f=false>

³¹ Faber, Daniel. "Tort Law in the Era of Climate Change, Katrina, and 9/11: Exploring Liability for Extraordinary Risks." Valparaiso University Law Review. Spring 2009. <https://scholar.valpo.edu/cgi/viewcontent.cgi?article=1118&context=vulr>

Event study on PG&E

Background

PG&E is one of the three major investor-owned utility companies in California serving 16 million ratepayers, primarily in Northern California. PG&E has declared Chapter 11 bankruptcy twice in the last 25 years: in 2001 and 2019. This case study will be focusing on the 2019 bankruptcy as that one has become known as the first corporate “Climate-Change Bankruptcy.”³²

Since 2015, the intensification of wildfires in Northern California has posed numerous challenges for PG&E. The Butte fire caused over \$1.1 billion in losses³³. Additionally, PG&E accrued a significant amount of liabilities when their electrical equipment was found to have caused numerous fires. In 2017, their equipment was found to have sparked 18 out of the major 21 fires in Northern California which resulted in them paying out more than \$3.5 billion dollars in damages³⁴. As damages and liabilities from the Butte fire continued to mount, the Camp Fire of 2018 was recorded as the state’s most deadly wildfire on record. PG&E estimated that liabilities from the Camp fire could exceed \$30 billion, excluding potential punitive damages or

³² Gold, Russell. “PG&E: The First Climate-Change Bankruptcy, Probably Not the Last.” WSJ. January 18, 2019. <https://www.wsj.com/articles/pg-e-wildfires-and-the-first-climate-change-bankruptcy-11547820006>

³³ “PG&E Corporation Form 10-K for the Fiscal Year Ended December 31, 2018,” Securities and Exchange Commission—EDGAR, February 28, 2019, <https://www.sec.gov/Archives/edgar/data/75488/000100498019000004/pge-123118x10k.htm>

³⁴ “PG&E Corporation Public-Side Lender Presentation,” PG&E Investor Relations, January 23, 2019, http://s1.q4cdn.com/880135780/files/doc_presentations/2019/Final-Public-SideLender-Presentation_012329.pdf.

finances. Unable to manage the potential damages, PG&E preemptively filed for Chapter 11 bankruptcy protection on January 14, 2019³⁵.

While numerous factors were at play, including PG&E's potentially negligent behavior and ineffective vegetation management practices, many experts consider PG&E to be the first climate-change caused bankruptcy as the increased frequency and intensity of the last few wildfire seasons were the primary catalyst of the financial stress PG&E was facing³⁶. To this day, credit reports by Moody's and S&P list wildfire risk as a significant credit risk to PG&E³⁷. Notably, PG&E previously filed for Chapter 11 bankruptcy in 2001, however, that was due to the statewide energy crisis caused by wholesale electricity prices that were significantly higher than the max retail prices consumers paid under the existing regulatory scheme. The 2001 bankruptcy has been largely attributed to the statewide energy deregulation in the 1990s that did not require utility companies to have power purchase agreements (PPAs) with wholesale distributors³⁸.

³⁵ "PG&E Corporation Form 10-K for the Fiscal Year Ended December 31, 2018," Securities and Exchange Commission—EDGAR, February 28, 2019, <https://www.sec.gov/Archives/edgar/data/75488/000100498019000004/pge-123118x10k.htm>

³⁶ Bloomberg, Michael. "PG&E Bankruptcy is a Wake-up Call on Financial Risks of Climate Change." LA Times. February 8, 2019. <https://www.latimes.com/opinion/oped/la-oe-bloomberg-climate-change-risk-disclosure-20190208-story.html>.

³⁷ Moody's PG&E Credit Report. February 8, 2023. https://www.moody.com/research/Moodys-changes-PGE-Corporation-and-Pacific-Gas-Electrics-outlooks-to--PR_473479

³⁸ Holson, Laura M. "California's Largest Utility Files for Bankruptcy." The New York Times. April 7, 2001. <https://www.nytimes.com/2001/04/07/us/california-s-largest-utility-files-for-bankruptcy.html>

Parties Involved and Incentive Alignment

Unlike most other non-utility Chapter 11 bankruptcies, California government officials directly involved themselves as a stakeholder in the PG&E bankruptcy to ensure that certain objectives were met. While the legislative process allows a variety of stakeholders to participate in the feedback process, the Chapter 11 process rarely involves stakeholders who aren't creditors. Given this limitation, Governor Newsom's team created the Wildfire Fund to give the state government an avenue to directly influence the process³⁹. Because they could dictate the terms PG&E needed to meet to access the fund, they were directly able to dictate the course of the bankruptcy⁴⁰. This dynamic strongly influenced the terms agreed to in the plan of reorganization and the dynamics between creditor groups.

The state government aimed to avoid backlash from constituents by using their political influence to increase the recoveries of certain creditor groups. Their objectives were at tension with the bankruptcy code which does not guarantee any returns to unsecured creditor groups if the total value of assets is deemed to be less than the total amount of secured claims. It is not uncommon for unsecured creditors to be impaired, or in extreme cases, get entirely wiped out. However, due to the political pressures at play, California politicians mandated that PG&E propose a rate-neutral plan that paid the fire victims, who were considered unsecured creditors, in full.

³⁹ "AB1054 Will Change the Way California Deals with Wildfires, so the Legislature Needs to Get it Right." The SF Chronicle. July 9, 2019. <https://www.sfchronicle.com/opinion/editorials/article/Editorial-AB1054-will-change-the-way-California-14083760.php>

⁴⁰ Elias, Jared and Triantis, George. "Government Activism in Bankruptcy." Emory Law Review. 2021. <https://scholarlycommons.law.emory.edu/ebdj/vol37/iss3/2/>

The state's political interest in avoiding constituent backlash directly conflicted with PG&E's goals to decrease their liabilities during the reorganization process. Debtors are not required to pay unsecured creditors in full if the value of the estate is deemed to be lower than all of the claims against the estate, but the bankruptcy code requires that all creditors in a given class receive a pro rata distribution. Thus, if PG&E were to pay fire victims in full, they would be required to pay all of their unsecured bondholders in full as well because they were *pari passu* with fire victims⁴¹. While the state had a clear interest in ensuring that fire victims were paid in full, this provision essentially guaranteed a bailout for all unsecured bondholders who normally would be expected to bear the cost of the damages given their low priority in the capital structure⁴².

The state's demands came at a steep cost as the reorganized PG&E had to take on a considerable amount of leverage to payoff, or extend the maturities of, unsecured creditors. PG&E exited bankruptcy with \$38 billion in debt compared to the \$22 billion they entered with⁴³. This outcome is counterproductive to the state's goal of encouraging responsible management of investor-owned utilities as the rapid increase in leverage could potentially jeopardize PG&E's credit rating if they were to run into financial distress in the future. Furthermore, half of the total contributions to the state's wildfire fund came directly from ratepayers, ultimately counteracting the requirement that PG&E have a rate-neutral plan.

⁴¹ *Pari Passu*, in the context of bankruptcy, means that creditors are considered to have the same degree of seniority in terms of recoveries.

⁴² Elias, Jared and Triantis, George. "Government Activism in Bankruptcy." *Emory Law Review*. 2021. <https://scholarlycommons.law.emory.edu/ebdj/vol37/iss3/2/>

⁴³ Roth, Sammy. "Meet the new PG&E. It looks a lot like the old PG&E." *The LA Times*. June 17, 2020. <https://www.latimes.com/environment/story/2020-06-17/pge-bankruptcy-new-pge-looks-like-old-pge>

Ultimately, PG&E emerged from bankruptcy on July 1, 2020 with a few notable provisions to satisfy state officials to the extent that PG&E could access the Wildfire Fund to pay future damages. PG&E agreed to pay \$25.5 billion in fire-related claims, including to victims, and to contribute to the state wildfire fund. To payoff existing unsecured bondholders, all existing unsecured debt was secured, the coupons decreased, and the maturities pushed out⁴⁴. PG&E raised significantly more capital during the Chapter 11 process to fund the damages they incurred during the 2017 and 2018 wildfire season. Upon reemergence, they issued \$5.2 billion in new equity. In accordance with Governor Newsom’s requirements for them to access the wildfire fund, PG&E appointed new board members who were California residents with extensive experience in the energy industry and created a chief risk officer and chief safety officer that report directly to the CEO⁴⁵. They were also required to increase investment in wildfire prevention measures to decrease future damages. If PG&E failed to meet any of these stipulations, the state had the ability to seize their assets⁴⁶.

The state’s influence on PG&E’s plan of reorganization did not come without concessions. In exchange for the protections offered to fire victims, state regulators assured shareholders their future liabilities would be limited through favorable cost recovery processes to access the wildfire fund. Regulators allowed investor-owned utilities to access the fund as long as they could prove they acted ““reasonably and prudently” based on what the utility knew or

⁴⁴ Brickley, Peg. “Under PG&E Deal, Bondholders Gain Protection Against Future Troubles.” WSJ. January 24, 2020. <https://www.wsj.com/articles/under-pg-e-deal-bondholders-gain-protection-against-future-trouble-11579907464>

⁴⁵ “PG&E raises \$5.5 billion as it eyes exit from bankruptcy next week.” Reuters. June 26, 2020. <https://www.reuters.com/article/us-pg-e-us-bankruptcy/pg-e-raises-5-5-billion-as-it-eyes-exit-from-bankruptcy-next-week-idUSKBN23X0WO>

⁴⁶ Per the terms of accessing the State Wildfire fund.

should have known at the time.⁴⁷ This lenient standard allows investor-owned utilities to access the fund even if their equipment sparks the fire that causes the damages. This policy essentially guarantees shareholders practically unconditional access to a state-bailout fund, which limits their own exposure to climate-related damages. While the state intended to use this fund to encourage PG&E to pay damages to fire victims in the on-going Chapter 11 bankruptcy, the creation of the fund jeopardizes long-term incentive alignment between shareholders and ratepayers for all California investor-owned utilities by decreasing shareholder exposure to future damages.

⁴⁷ In re S. Cal. Edison Co., No. 87-08-021, 1987 Cal. PUC LEXIS 588, at *28-29 (Cal. Pub. Util. Comm'n June 15, 1987)

Event Study

To understand how government involvement in investor-owned utility Chapter 11s affect investor's perception of risk to their bond returns, I conducted an event study on the 2019 PG&E Chapter 11 bankruptcy. I analyzed the bond trading prices on the secondary market of PG&E and their two peer companies, San Diego Gas & Electric (SDG&E) and Southern California Edison (EIX). Bond event studies can be useful to understand how investors react to new information by evaluating changes in trading prices on the secondary market after new information is disseminated. In this case, I am hoping to elucidate bondholder sentiment related to their perceived risk based on new information about the magnitude of the climate damages from the 2017 and 2018 wildfire season and investors' perception of the effect of the state government's actions. This analysis can show how investors perceive risk and what government actions can lead to incentive alignment between investors and ratepayers.

In the context of PG&E's bankruptcy, I am interested in bondholder reactions to two types of information: new information about the severity of the climate risk present in the region and about the state government's intended actions in relation to the bankruptcy (potential of a bailout, punitive regulatory actions, etc.). Risk to utility bondholders during a climate disaster can largely be thought of as a combination of climate risk and political economy risk. Climate risk translates to the risk of damages, which if substantial, could impair the company's ability to meet their debt obligations. Political economy risk can be thought of as the probability that government actions would increase or decrease investor's risk if there are damages. Actions like a bailout would decrease investor risk, but further regulations or punitive fines would increase investor risk. It is hard to disentangle climate risk from political risk to quantify them separately because they often are directly related, but I am interested in how bond prices changed on the

secondary market in response to new information related to these two factors in the period leading up to, during, and shortly after the PG&E bankruptcy.

In addition to PG&E's bond performance, I am interested in the bond trading prices of their two peer companies as they are experiencing similar levels of climate risk and political economy factors as PG&E since they operate in the same region and have the same regulators and legislators. However, since they are not actively experiencing a Chapter 11 bankruptcy, their trading prices will likely exclude bankruptcy-specific factors affecting PG&E's bond pricing such as proposed recoveries under the plan of reorganization, inter-creditor disputes, and access to rights offerings. Additionally, since all three companies are of relatively comparable size and operate within the same regulatory perimeter, it would be reasonable for investors to expect political economy factors in PG&E's bankruptcy to apply to them if their company was to experience financial distress. Thus, fluctuations in the trading prices of peer company bonds can point to changes in investor sentiment about risk attributed to climate and political economy risk in the region. More broadly this analysis can shed light on how investor's view climate risk: as a systemic risk or an isolated problem that PG&E had to deal with. Correlated movements in trading prices between PG&E and peer companies would imply that investors see climate risk as a broad risk to the region.

Methods

To conduct this analysis, I compiled daily TRACE bond trading prices for all three companies from 2017-2022⁴⁸. For peer companies Sempra and Edison International, I exclusively analyzed bonds issued and guaranteed by the regional operating subsidiaries San Diego Gas and Electric (SDG&E) and Southern California Edison (EIX) to limit exposure to their operations outside of California. My window of interest was 2018-2020 as that included the events leading up to PG&E's bankruptcy through their emergence⁴⁹. For dates that had multiple transactions at different prices, I used an average of the prices to compute a daily average trading price. For dates that had no transactions, I pulled the last known trading price. To control for general macroeconomic factors, I used an investment grade corporate bond ETF (NYSEARCA: LQD) as a control variable. I separated the bonds of each company into short-to-mid-term maturities and long-term maturities as existing research on climate risk premiums for municipal bonds finds that only long-term maturities are affected by climate risk. Studies have found that long-term bondholders are more likely to realize the damages over a period of many climate events while short-term bondholders are more likely to be able to cash out before any of the damages from climate change are fully realized⁵⁰.

To identify events that provided new information to investors, I compiled documents from California Public Utility Commission (CPUC), state and local elected officials, and the PG&E bankruptcy docket that pertained to information related to climate risk and damages or the state's proposed legislative response. Within the timeframe of interest (2018-2020), I identified eight

⁴⁸ All bond historical trading prices were pulled from Bloomberg.

⁴⁹ PG&E officially declared bankruptcy on January 29, 2019.

⁵⁰ Painter, Marcus. "An inconvenient cost: The effects of climate change on municipal bonds." *The Journal of Financial Economics*. February 2020.
<https://www.sciencedirect.com/science/article/pii/S0304405X19301631>

major events of interest that provided investors with new knowledge about the riskiness of their investment. A timeline of these events is listed below along with a brief description of their importance. Negative price changes after an event would imply investors see their investment as less desirable or of higher risk while positive price changes would imply strengthening investor confidence.

To track investor sentiment related to new information, I calculated the change in average monthly bond prices between the month where the new information was announced and the previous month. Monthly average bond prices were calculated by averaging all daily average trading prices for each bond issuance for each company. I then calculated an average change in price for all bonds with maturities 2018-2028 (short and mid-term maturities) and 2028 onwards (long-term maturities) for each company, where each issuance of bonds is equally weighted in the average. I also calculated the monthly price changes for the control variable to track general macroeconomic changes. The bonds of all three companies are relatively liquid and tend to have multiple trades per day, meaning that investor reactions to new information should be captured relatively soon after the information becomes available to the market. Because I am only interested in monthly changes in bond trading prices, I will only refer to events by the month and year they occurred in. I am also designating each of these events as positive or negative news from the perspective of a bondholder of one of the three California-based investor-owned utilities. Any event that appears to make their returns riskier will be marked as negative.

Results

A timeline of relevant events is provided below:

- 6/18: PG&E releases an 8-K stating the possibility of bankruptcy if they incur further liabilities related to wildfires (negative)⁵¹.
- 11/18: The Camp fire starts and ends. It is recorded as the deadliest and costliest fire in California history (negative)⁵².
- 1/19: PG&E files for Chapter 11 bankruptcy protection (negative)⁵³.
- 3/19: PG&E is cleared of criminal charges from their involvement in the 2017 fires (positive)⁵⁴.
- 7/19: Governor Gavin Newsom signs the \$21B wildfire fund legislation that allows investor-owned utilities to pay out future liabilities from the fund (positive)⁵⁵.
- 10/19: Local and state lawmakers start calling for a state-takeover of PG&E due to the lack of progress in the Chapter 11 case (negative)⁵⁶.
- 1/20: A restructuring support agreement (RSA) is signed, which shows creditor support for PG&E to reorganize under the proposed plan (positive)⁵⁷.

⁵¹ PG&E 8-K filed on 06/21/2018. <https://d18rn0p25nwr6d.cloudfront.net/CIK-0001004980/973dafb3-03d3-48d9-9030-cd2fa5cd8257.pdf>

⁵² Nicas, Jack and Fuller, Thomas. "Wildfire Becomes Deadliest in California History." New York Times. November 9, 2018. <https://www.nytimes.com/2018/11/12/us/california-fires-camp-fire.html>

⁵³ "PG&E Files for Reorganization Under Chapter 11." SEC filing. January 29, 2019.

<https://www.sec.gov/Archives/edgar/data/75488/000119312519019657/d700325dex991.htm>

⁵⁴ Gorman, Steve. "PG&E spared criminal charges in deadly 2017 California wildfires." Reuters. March 12, 2019. <https://www.reuters.com/article/us-california-fire-pg-e/pge-spared-criminal-charges-in-deadly-2017-california-wildfires-idUSKBN1QU08W>

⁵⁵ Chrisite, Jim. "California governor signs bill for \$21 billion wildfire fund." Reuters. July 12, 2019.

<https://www.reuters.com/article/us-california-wildfire-legislation/california-governor-signs-bill-for-21-billion-wildfire-fund-idUSKCN1U72LI>

⁵⁶ Surran, Carl. "California governor threatens state takeover in PG&E bankruptcy case." Seeking Alpha. November 1, 2019. <https://seekingalpha.com/news/3513326-california-governor-threatens-state-takeover-in-pg-and-e-bankruptcy-case>

⁵⁷ "PG&E continues Chapter 11 progress by securing more than 2/3 support for noteholder restructuring support agreement." PG&E Investor Relations. January 29, 2020. <https://investor.pgecorp.com/news-events/press->

- 6/20: A judge approves the reorganization of PG&E and they emerge from bankruptcy (positive).

Two tables depicting the changes in average monthly trading prices by company and maturity is depicted below.

1. Changes in Monthly Bond Trading Prices by Company and Maturity

Short-term maturities bond price movements				
Date	PG&E	SDG&E	EIX	Control
6/18	-0.88%	0.15%	-0.16%	-0.29%
11/18	-5.05%	-0.17%	-1.99%	-1.10%
1/19	-7.47%	0.47%	-0.29%	1.65%
3/19	5.09%	0.53%	1.50%	0.90%
7/19	4.63%	0.71%	2.89%	1.25%
10/19	-0.20%	0.23%	-0.58%	0.23%
1/20	2.10%	0.40%	1.55%	0.97%
6/20	8.28%	1.86%	1.21%	3.10%

Long-term maturities bond price movements				
Date	PG&E	SDG&E	EIX	Control
6/18	-2.96%	0.10%	-0.58%	-0.29%
11/18	-8.95%	-1.46%	-4.47%	-1.10%
1/19	-5.57%	0.22%	0.62%	1.65%
3/19	4.79%	0.65%	1.17%	0.90%
7/19	6.02%	2.84%	3.53%	1.25%
10/19	-0.91%	0.39%	-0.77%	0.23%
1/20	4.48%	1.84%	2.29%	0.97%
6/20	6.33%	0.71%	1.47%	3.10%

Based on the data, long-term bonds were more sensitive to new information during the time period of interest. This finding is in line with the study on climate risk and municipal bonds that finds that long-term bondholders are more concerned with climate risk as they believe they may be more likely to realize the risks over the long horizon of their maturity. The Camp fire (1/18) had a significant impact on PG&E and EIX bonds. Additionally, the passage of the

[releases/press-release-details/2020/PGE-Continues-Chapter-11-Progress-by-Securing-More-Than-Two-Thirds-Support-for-Noteholder-Restructuring-Support-Agreement/default.aspx](https://www.pge.com/about-us/newsroom/releases/press-release-details/2020/PGE-Continues-Chapter-11-Progress-by-Securing-More-Than-Two-Thirds-Support-for-Noteholder-Restructuring-Support-Agreement/default.aspx)

legislation that created the Wildfire Fund (7/19) and the announcement of a restructuring support agreement (1/20), which signaled that it was likely that PG&E would emerge from bankruptcy with creditor support, lead to positive price movement for all three companies' bonds.

The positive price movement for all three companies following the creation of the wildfire fund and the announcement of the restructuring support agreement signaled that investors were relatively optimistic about their investments due to PG&E's ability to garner financial support from the state government through the creation of the Wildfire Fund and exit the bankruptcy process in a relatively reasonable timeframe. Interestingly, the emergence of PG&E from bankruptcy on 6/20 did not have a positive effect on the other two companies' bonds. However, it is likely that the market already priced in this information after the restructuring support agreement was announced on 1/20.

Peer company short-term bonds only saw notable price movements on 11/18 when the Camp fire was burning in northern California. PG&E saw the largest downward pricing pressure as the fire was predominately in their service area. EIX saw considerably more downwards price movement than SDG&E as the majority of their operations are in central California, while SDG&E's exposure is mostly in southern California which was not affected by the fire. Notably, PG&E's Chapter 11 filing in 1/19 did not lead to notable price changes for SDG&E and EIX's short-term bonds which suggests that investors saw PG&E as an isolated event rather than the first in a series of climate-related utility bankruptcies. While it is possible that SDG&E and EIX did not see downwards price movements because investors had already priced in the risk of bankruptcy, that is likely not the case since PG&E bonds saw considerable downwards price movement after announcing the bankruptcy meaning that the risk was likely not completely priced in at the time of announcement.

To capture the general trading patterns of these bonds throughout the period of interest, I tracked their correlation to a control variable. Vastly different correlations between short-term and long-term maturities and their corresponding control variable could reveal how investor's view climate risk based on tenor. Additionally, vast differences between companies would suggest that investors are viewing climate risk as isolated to certain companies based on geographical or financial factors, such as their credit rating or how many fires are in their region of service. To make the control variables as reliable as possible, I used a short to mid-term investment grade corporate bond ETF (NYSE: IGSB) as the control variables for bonds maturing from 2018-2028 and a long-term corporate bond ETF (NYSE: VCLT) to control for tenor-related interest rate factors and other risks specifically related to long-term corporate bonds.

By looking at the correlation between each companies' bonds pricing movements and the corporate bonds ETFs, I am hoping to understand how much of the pricing movements can be attributed to region and industry specific factors rather than macroeconomic fluctuations. A very high correlation would imply that pricing movements in the three companies' bonds have little to do with regional climate factors, political economy factors, such as legislative or regulatory proposals, or risk associated with being a utility provider. Since the bond ETFs hold bonds from a variety of geographies that are all experiencing varying levels of climate risk, I am hoping to see if California-based investor-owned utilities are experiencing a risk premium due to the outsized climate risk in the region and the utility industry's sensitivity to this risk.

The average correlations from 2018-2020 for each company based on tenor are depicted in the table below. Additionally, graphs depicting the trading prices of all of the bond issuances for all three companies during the time period of interest are included below to illustrate the trading patterns based on new information investors learned. EIX and SDG&E bonds are split

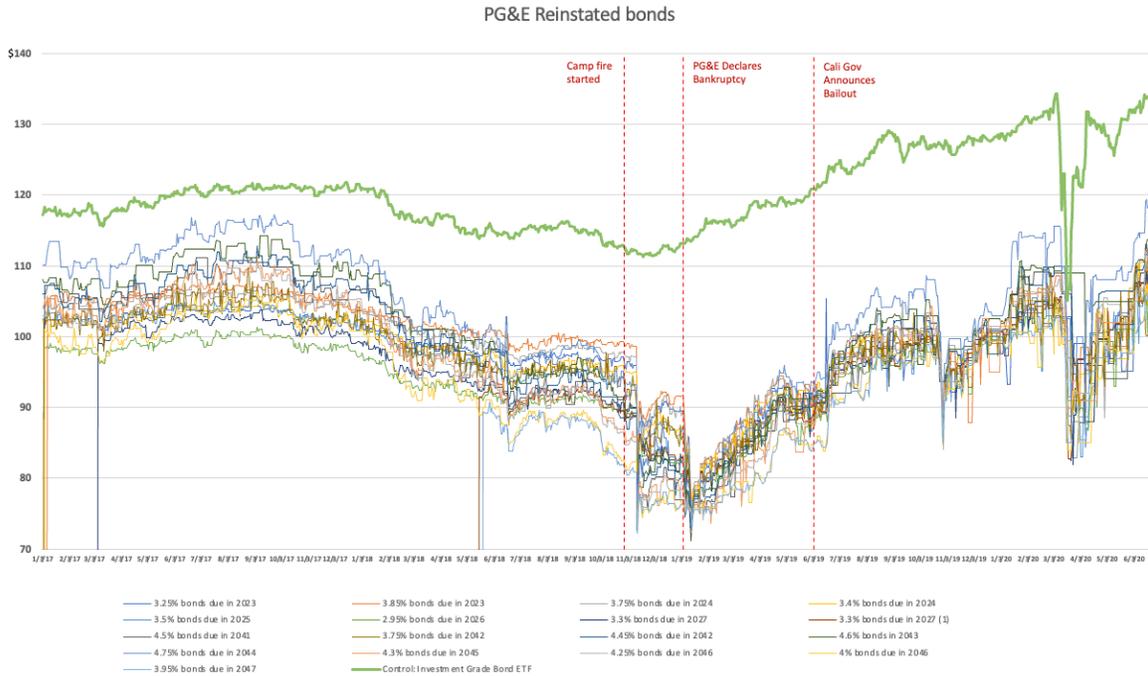
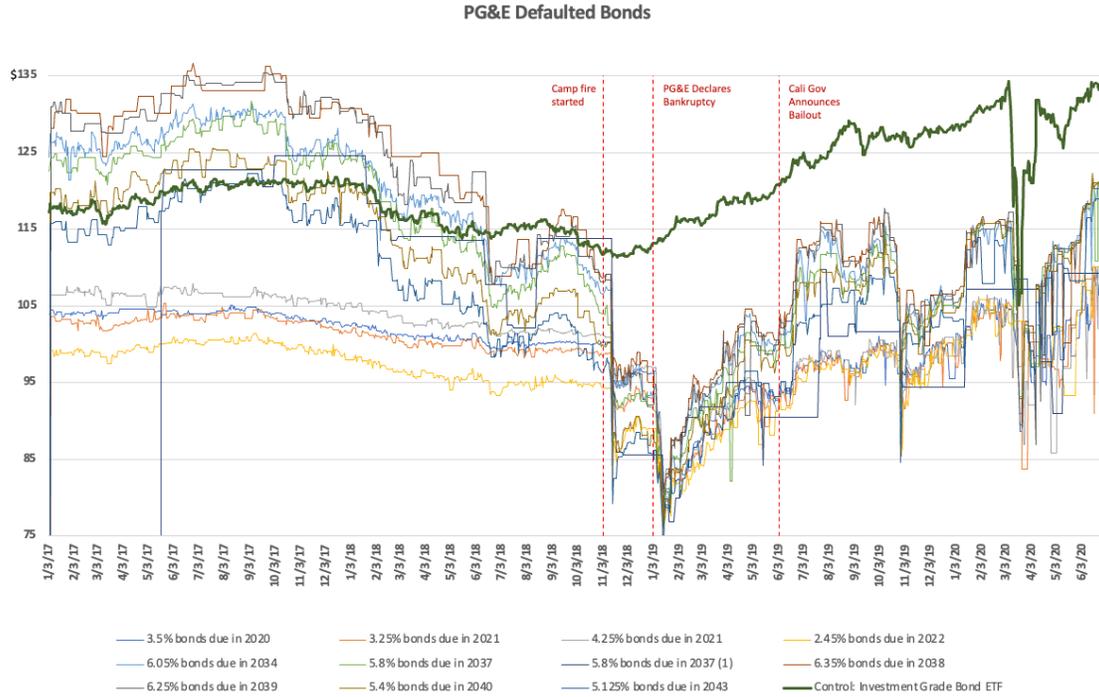
based on maturity and PG&E bonds are split based on bonds that were defaulted on (and replaced with new issuances after emerging) and those that were reinstated as is after bankruptcy.

2. Correlations Between Each Company's Bond Trading Prices and The Control Variable

Short-term maturities correlation to control variable	
Company	Correlation
PG&E	73.27%
SDG&E	82.31%
EIX	65.69%

Long-term maturities correlation to control variable	
Company	Correlation
PG&E	71.66%
SDG&E	88.10%
EIX	85.86%

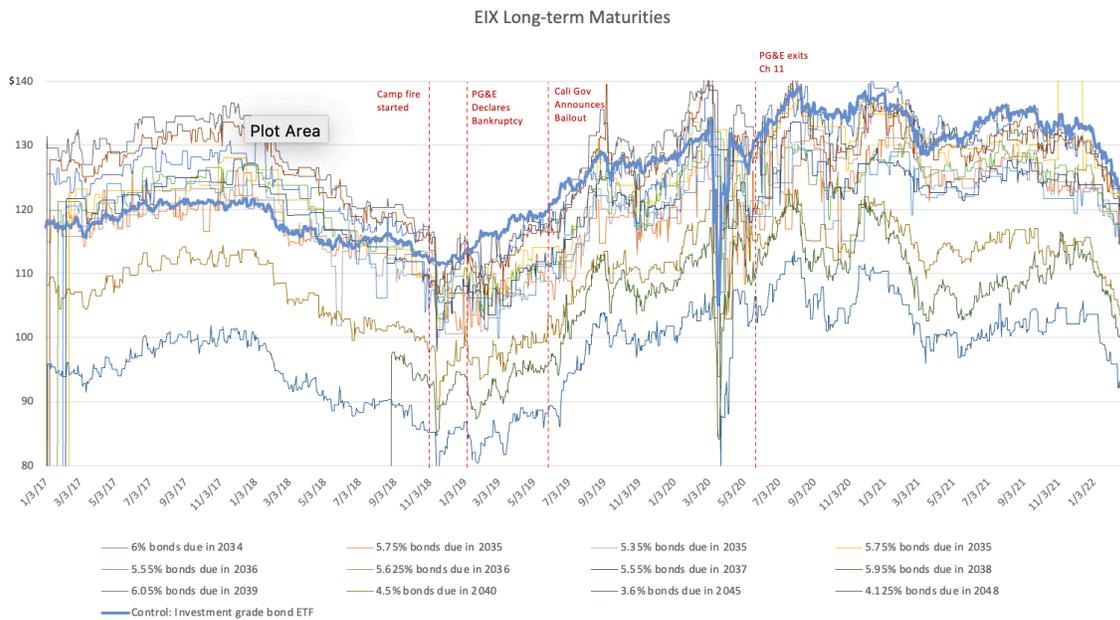
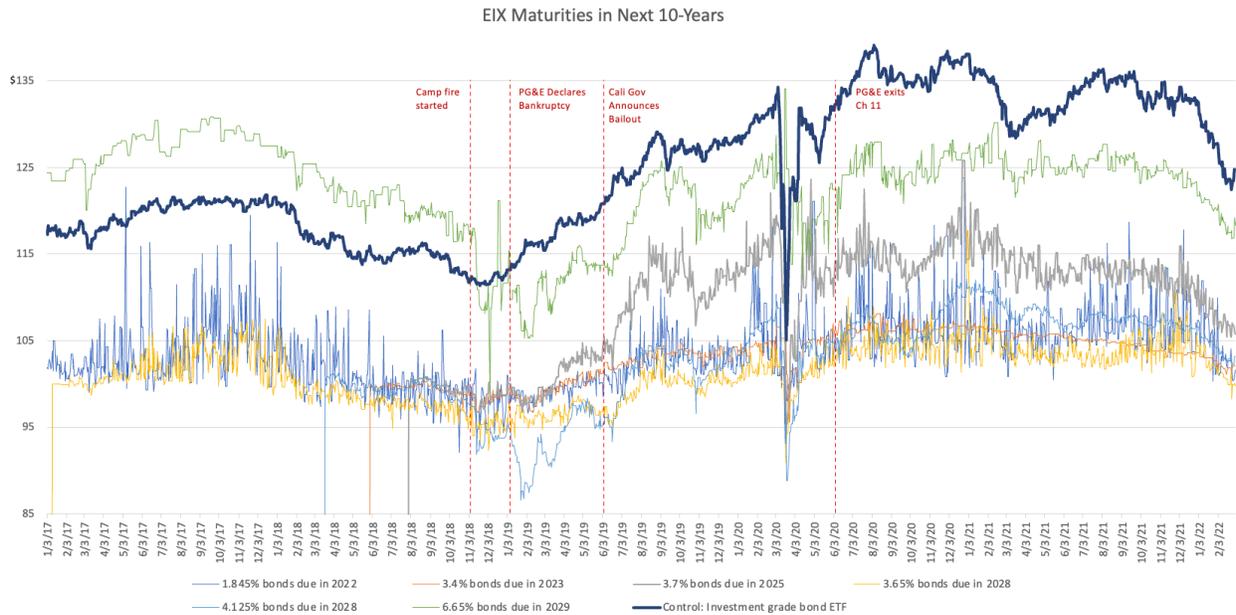
3. PG&E Historical Bond Pricing



Source: Bloomberg. Data as of 1/20/23. All debt graphed is on an unsecured basis. Trading data for defaulted bonds ends on date of reemergence (June 2020) as new bonds were issued once PG&E exited bankruptcy. For consistency, reinstated bond trading prices are graphed according to the same period. In communications not

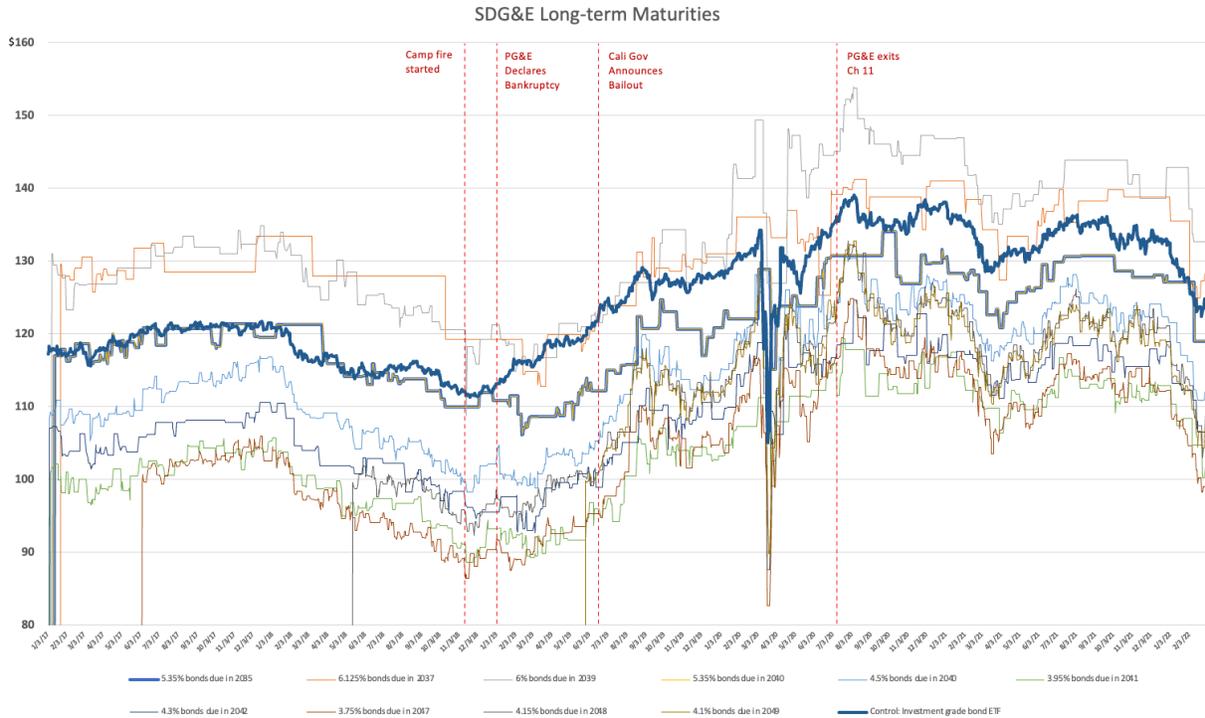
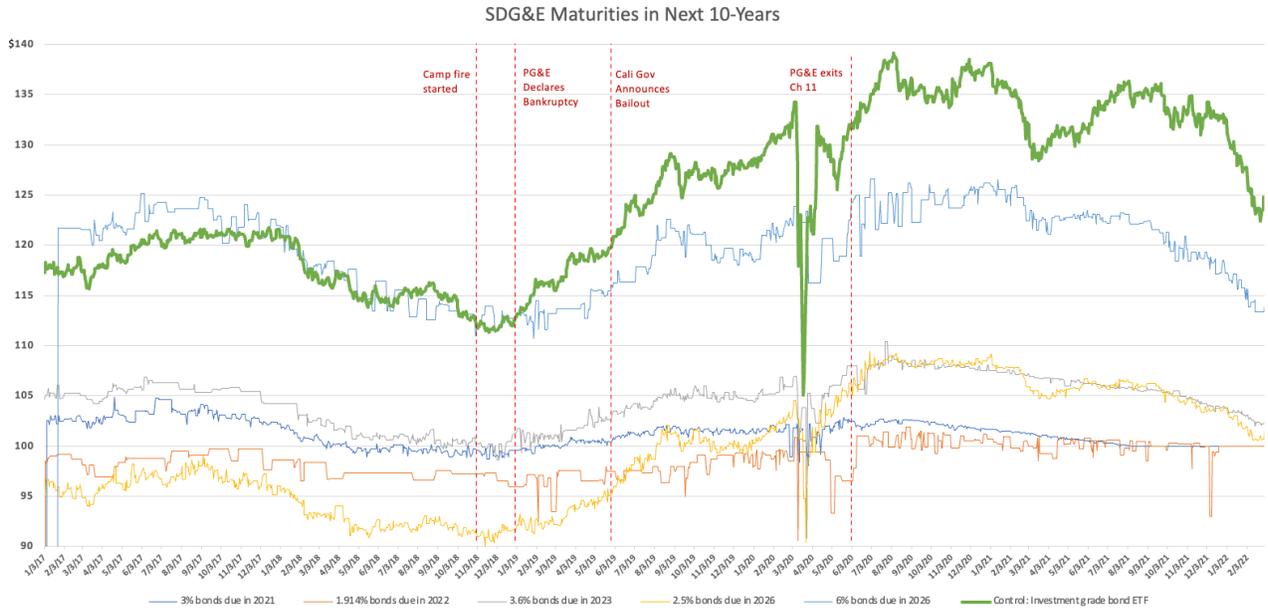
for attribution, energy analysts speculated that high trading premiums are attributable to a favorable regulatory environment.

4. EIX Historical Bond Pricing



Source: Bloomberg. Data as of 1/20/23. All bonds depicted are bonds issued under Southern California Edison (subsidiary of parent company Edison International) to isolate for California specific climate and political factors.

5. SDG&E Historical Bond Pricing



Source: Bloomberg. Data as of 1/20/23. All bonds depicted are bonds issued under SDG&E (subsidiary of parent company Sempra) to isolate for California specific climate and political factors.

Discussion

Contrary to municipal bond studies that indicate that long-term bonds tend to be more sensitive to climate risk, all three companies' bonds have a high average correlation with the control variable (~72%-88%). This suggests that holding all other factors constant, investors don't view long-term investor-owned utility bonds in California to be significantly riskier than long-term investment grade corporate bonds in other industries with exposure to other geographies. PG&E's long-term bonds' correlation is lower than its peers which can likely be explained by the uncertainty of credit recoveries in 2019-2020 during the bankruptcy.

Interestingly, there is quite a bit of discrepancy in the average correlations of the three companies' short-to-mid-tenor bonds (~66%-82%). One relevant factor is SDG&E has maintained a considerably higher credit rating than their peers (SDG&E: BBB+, EIX BBB-, PG&E BB). Fitch reports that SDG&E has maintained a high credit rating is due to their parent company's investments in Texas and Mexico which diversifies their geographical exposure and their long-term infrastructure contracts that provide stable revenue⁵⁸. Interestingly, EIX had a lower correlation with the control variable than PG&E, which is peculiar considering PG&E was actively undergoing a bankruptcy for half of this period. One likely explanation is that PG&E investors were confident there would be a legislative solution to prevent a failed Chapter 11 bankruptcy or that the plan of reorganization would contain a rights offering or some other favorable investment opportunity. A successful emergence from Chapter 11 could had the potential to be very advantageous to PG&E's profitability as they can reject unfavorable contracts and negotiate more favorable terms on their debt. However, EIX was struggling with

⁵⁸ Sempra Energy Rating Report. Fitch Ratings. August 31, 2020.
<https://www.fitchratings.com/research/corporate-finance/sempra-energy-31-08-2020>

credit downgrades during the same period due to increased wildfire activity, high-leverage, and third-party liabilities from 2017-2018 estimating \$8.8 billion⁵⁹. Since they were not actively undergoing the Chapter 11 process like PG&E, they had no clear path to dealing with high-leverage and the maturity walls and interest payments associated with them.

Overall, it does not appear that SDG&E and EIX bonds are experiencing a significant climate risk premium due to the PG&E bankruptcy. In 2022, their bonds were trading above pre-2019 levels implying that they have recovered from any of the downwards price pressures during the Camp fire or PG&E bankruptcy. Accordingly, while the cost of borrowing for PG&E and EIX increased after the Camp fire, it fell close to pre-Camp fire levels by mid-2019⁶⁰. Despite dealing with increasing weather-related damages, as a whole, U.S. investor-owned utilities' cost of borrowing is at a historical low. This low borrowing cost implies that investor confidence in the sector has remained strong despite the increasing number of Chapter 11 bankruptcies.

Proponents of taxpayer-funded bailouts argue that government intervention is needed for financially distressed utility companies to secure funding due to their outsized climate risk. However, contrary to that claim, the cost of borrowing for investor-owned utilities is at a historic low relative to treasury spreads implying that investors do not see utility companies as undesirable investments. These low borrowing costs support the idea that investors likely believe that the cost of climate damages will be primarily borne by ratepayers, governments, or

⁵⁹ “Fitch Rates Edison International’s Sr. Notes “BBB-.” November 7, 2022. <https://www.fitchratings.com/research/corporate-finance/fitch-rates-edison-international-sr-notes-bbb-07-11-2022#:~:text=In%20May%202022%2C%20Fitch%20affirmed,Outlook%20to%20Positive%20from%20Stable.>

⁶⁰ MacWillimans, John et al. “PG&E: Market and Policy Perspectives on the First Climate Change Bankruptcy.” Columbia Center on Global Energy Policy. August 2019. https://www.energypolicy.columbia.edu/wp-content/uploads/2019/08/PGE-CGEP_Report_111722.pdf

insurance companies, insulating their investments. If investor's view government bailouts as likely, they may not feel compelled to factor climate risk into investor-owned utility bonds. Low utility borrowing costs may seem beneficial since this could theoretically lead to benefits trickling down to ratepayers, however it creates a perverse incentive for utility companies to become over leveraged. High leverage can eventually cost ratepayers in the form of bailout or legislative solution as in the PG&E bankruptcy. Because utility companies are viewed as too systemically important to fail, the cost of failure often directly falls on taxpayers.

While decreasing the amount of taxpayer dollars involved in investor-owned utility bankruptcies may increase the cost of borrowing for utility companies in the short-term, it can serve to increase incentive alignment between management and ratepayers in the long-term. If the cost of debt increases, management will have to be more thoughtful about their capital structure which may decrease their optimal leverage and the probability of financial distress in the long-term. Additionally, if taxpayers are no longer viewed as an implicit safety net, investor-owned utilities will have to employ other strategies to decrease their risk profile to drive down their cost of debt. Some of these strategies, such as investments in asset resiliency or more conservative capital structures, will benefit ratepayers by decreasing the likelihood of service disruptions and financial distress.

Policy Recommendations

Given the high cost of government-funded interventions, there are other financing solutions that should be considered to fund climate-related damages. Commercial insurance alone is rarely enough to cover the magnitude of damages from climate catastrophes. For example, PG&E purchased \$1.4 billion in liability coverage for the 2018 wildfire season. However, due to the severity of the damages, their liability exceeded \$15 billion even after insurance⁶¹.

One possible solution is for investor-owned utilities to issue catastrophe bonds. Catastrophe bonds are issued to transfer the risk associated with high magnitude, idiosyncratic events that may overwhelm traditional insurance markets. Investor-owned utilities can issue catastrophe bonds by creating an SPV for investor funds. Investors receive a return during the period that their funds are held in the SPV. If a clearly defined “triggering event” occurs, the principal of the investment is transferred to the investor-owned utility for them to cover the cost of damages. If no triggering event occurs during the timeframe of the investment, the principal is returned to the investor. Catastrophe bonds can also return amounts of principal proportional to the severity of the catastrophic event so investors don’t lose their entire investment every time a climate event occurs. Both PG&E and SDG&E have used catastrophe bonds to cover some of their wildfire-related liabilities.

Another potential solution is for all the investor-owned utilities in a state to create a captive. Captives are a form of self-funded insurance where the insurance provider is owned by the insured entity. Historically, captives have been used when commercial insurance is not

⁶¹ Wade, Will and Chiglinisky, Katherine. “For PG&E, having enough wildfire insurance won’t come cheap.” Bloomberg. November 16, 2018. <https://www.bloomberg.com/news/articles/2018-11-16/for-pg-e-having-enough-wildfire-insurance-wouldn-t-come-cheap>

available or cost effective. Utilities can join together and create a group captive to cover liabilities. They can contribute to a join fund that is managed by an elected board of directors. Additionally, premium payments to a captive are tax deductible, offering a benefit to the company. The usage of captives to cover climate-related liabilities is preferable than a state created fund because access to the fund would be determined by the group of companies themselves as opposed to government officials. Additionally, ratepayer dollars would not be directly contributed to the captive unlike the California state Wildfire Fund. Captives have been used in the nuclear energy industry as there was a period where they struggled to obtain commercial insurance⁶².

Additionally, long-term payment plans can be included in plans of reorganizations to allow debtors to have time to repay damages. In Brazos Electric's 2021 bankruptcy, the judge approved a plan that allowed Brazos to repay 76% of what they owed power generators up front or repay 100% of the value over 30 years⁶³. This policy allows the debtor to repay creditors without the government directly contributing taxpayer funds.

⁶² Kousky, Carolyn et al. "Financing Third Party Wildfire Damages: Options for California's Electric Utilities." Wharton Risk Management and Decision Processes Center. February 2019. <https://riskcenter.wharton.upenn.edu/wp-content/uploads/2019/02/Financing-Third-Party-Wildfire-Damages-Options-for-Californias-Electric-Utilities.pdf>

⁶³ Biswas, Soma. "Texas Co-op Brazos Advances Chapter 11 Settlement of Winter Storm Bill." WSJ. September 14, 2022. <https://www.wsj.com/articles/texas-co-op-brazos-advances-chapter-11-settlement-of-winter-storm-bill-11663192408>

Conclusion

If PG&E was the first climate changed-caused bankruptcy, there have already been numerous others. Climate change damages will gradually increase stress to investor-owned utilities as damages continue to accrue. Usually, when markets identify outsized risk in a sector, the cost of capital increases, which creates a market incentive for companies to invest in risk mitigating measures or exit the market entirely. Absent government intervention, this market incentive to mitigate risk to decrease borrowing costs would encourage investor-owned utility companies to invest in climate mitigation efforts.

Government interventions in investor-owned bankruptcies serve to undermine incentive alignment by shielding investors from climate damages. Due to the precedent of government assistance in investor-owned utility bankruptcies, utilities have chronically underinvested in asset resiliency measures that have been proven to mitigate damages from climate events. The event study depicts the extent to which governmental interventions, such as California's wildfire relief fund, serve to undermine incentive alignment by decreasing the climate risk investors perceive. The study shows that the creation of the California wildfire fund led to the strongest jump in peer company bond trading pricing. This finding suggests that the reason that California investor-owned utility company bonds continue to trade above par, despite the PG&E bankruptcy, is due to the overly favorable regulatory environment.

While government interventions are justified in the name of preserving essential utility services, they end up protecting shareholders and costing ratepayers. In the PG&E bankruptcy, although the government attempted to protect ratepayers by mandating stringent requirements for PG&E to access the fund, half of the costs for the wildfire fund came directly from rate increases. Meanwhile, nearly all unsecured bondholders were all given nearly full recoveries.

Instead, governments should encourage cost effective investment in climate mitigation efforts. Legislation like California's Wildfire relief fund shift the risk to the public sector while allowing profits to be retained by shareholders. Regulators should also ensure that costs are not directly passed on to ratepayers through rate increases. Regulatory action should aim to balance the reliability, sustainability, and profitability of investor-owned utilities. In the absence of regulatory action, climate change may permanently raise the cost and decrease the reliability of electricity services in regions highly affected by climate change. Investor-owned utilities should seize the opportunity to invest in cost-effective mitigation efforts as many regions are a few catastrophic events away from severe infrastructure damages.